Teaching Guide				
Identifying Data				2018/19
Subject (*)	Mathematics		Code	610G02003
Study programme	Grao en Bioloxía			
Descriptors				
Cycle	Period	Year	Type	Credits
Graduate	1st four-month period	First	Basic training	6
Language	Spanish			
Teaching method	Face-to-face			
Prerequisites				
Department	Matemáticas			
Coordinador	Ferreiro Ferreiro, Ana María	E-mail	ana.fferreiro@udc.es	
Lecturers	Ferreiro Ferreiro, Ana María García Rodríguez, José Antonio Otero Verea, Jose Luis Prieto Aneiros, Andrés	E-mail	ana.fferreiro@udc.es jose.garcia.rodriguez@udc.es luis.verea@udc.es andres.prieto@udc.es	
Web				
General description	This subject aims at developing skills that will allow to the studens to develop a critical knowledge of differential calculus and integration, as well as at providing a small introduction to linear algebra and to differential equations			

Study programme competences / results	
Code	Study programme competences / results
A21	Deseñar modelos de procesos biolóxicos.
B1	Aprender a aprender.
B2	Resolver problemas de forma efectiva.
B3	Aplicar un pensamento crítico, lóxico e creativo.
B4	Traballar de forma autónoma con iniciativa.
B5	Traballar en colaboración.
B6	Organizar e planificar o traballo.
B7	Comunicarse de maneira efectiva nunha contorna de traballo.
B8	Sintetizar a información.
B9	Formarse unha opinión propia.
B10	Exercer a crítica científica.
B12	Adaptarse a novas situacións.
B13	Comportarse con ética e responsabilidade social como cidadán e como profesional.

Learning outcomes	
Learning outcomes	Study programme competences / results

Integration and applications	A21	B1 B2 B3 B4 B5 B6 B7 B8 B9 B10 B12 B13	
Differentiation and applications	A21	B1 B2 B3 B4 B5 B6 B7 B8 B9 B10 B12 B13	
Linear algebra and applications	A21	B1 B2 B3 B4 B5 B6 B7 B8 B9 B10 B12 B13	
Differential equations and applications	A21	B1 B2 B3 B4 B5 B6 B7 B8 B9 B10 B12 B13	

Contents

Topic	Sub-topic
? Differentiation	o Basic Rules of Differentiation. o The Chain Rule. o Techniques Differentiation. o L'Hôpital's Rule. Taylor's Theorem. o Applications of Differentiation. o Maxima and Minima. o Optimisation Problems. o The Newton-Raphson Method.
? Integration	o Integration as Summation. o Fundamental Theorem of Calculus. o Some Basic Integrals. o Integration by Substitution. o Integration by Parts. o Integration of Rational Functions. o Geometrical Applications of Integration. o Numerical Integration. Simpson's Rule. o Improper Integrals.
? Linear Algebra	o Systems of Linear Equations o Elementary operations. o The Algebra of Matrices. o Determinants. Basic properties. o The determinant rank. o Eigenvalues and Eigenvectors. o Normal forms for matrices. o Cayley-Halmiton theorem.
? Ordinary Differential Equations.	o First Order Differential Equations. o Separable First Order Differential Equations. o Linear First Order Differential Equations. o Applications of First Order Differential Equations. o Second Order Linear Differential Equations with Constant Coefficients. o Homogeneous Linear Systems with Constant Coefficients.

Planning				
Methodologies / tests	Competencies / Results	Teaching hours (in-person & virtual)	Student?s personal work hours	Total hours
Guest lecture / keynote speech	A21 B2 B3 B6 B13	32	64	96
Problem solving	A21 B1 B2 B3 B4 B5 B6 B7 B8 B9 B10 B12	8	18	26
Supervised projects	A21 B1 B2 B3 B8 B9 B10 B12 B13	8	16	24
Objective test	B1 B2 B3 B4 B8 B9 B10 B13	3	0	3
Personalized attention		1	0	1
(*)The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.				

Methodologies	
Methodologies	Description
Guest lecture / keynote speech	Desenvolvemento dos conceptos e resolución de problemas
Problem solving	Cuestionarios, boletins e exames doutros cursos que periodicamente poranse a disposición dos alumnos sobre distintos contidos e que o alumno terá que resolver.
Supervised projects	Traballo sobre temas propostos polo profesor, presentarase un resumo teórico xunto cun boletín de problemas resoltos acerca do tema correspondente
Objective test	Desenvolvemento de cuestións e problemas da materia

Personalized attention	
Methodologies	Description
Guest lecture / keynote speech Supervised projects Problem solving	The personalised attention that describes in relation to these methodologies conceive like moments of face-to-face work for the student with the professor, by what involve a participation for the student; the form and the moment in that it will develop will indicate in relation to each activity along the course according to the plan of work of the subject. The measures of specific personalised attention for or student with recognition of dedication part time and dispenses academician of exemption of assistance for the study of the matter, will be delivery of questionnaires, bulletins and examinations of other courses that will put to disposal of the students on distinct contents and that the student will have to resolve.

Assessment			
Methodologies	Competencies / Results	Description	**Qualification**
Guest lecture / keynote speech	A21 B2 B3 B6 B13	Questions to the students.	10
Supervised projects	A21 B1 B2 B3 B8 B9 B10 B12 B13	Development of specific aspects with examples and solved problems. Competence B3 will be assessed.	10
Problem solving	A21 B1 B2 B3 B4 B5 B6 B7 B8 B9 B10 B12	Delivery of exercises and solved exams. Competences A15, B2 and C3 will be assessed.	10
Objective test	B1 B2 B3 B4 B8 B9 B10 B13	Desenvolvemento de cuestións e resolución de problemas da materia	70

Assessment comments
To surpass the subject it will be necessary to obtain, after adding the qualifications of all the activities, a minimum note of 50% of the total. To obtain the qualification of no presented, it will be sufficient that the student do not participate in the objective proof and have not been evaluated in more than 50% of the guided works. In the second opportunity the criterion to surpass the subject will be the previous or to reach a mark no less than 50% in the objective proof. Regarding successive academic courses, the process of education-learning, included the evaluation, refers to an academic course; nevertheless it allows request keep the qualification of practices of a previous course. Guided work qualifications are only kept between courses on student demand. The students enrolled in regime of partial time and academic exemption from attendance exemption, can be evaluated in a personalised way regarding the methodologies of theory sessions, problem solving and guided works. For the students enrolled in the partial time regime it is compulsory to make the objective proof, as well as the partial proofs along the course. For the first and second opportunity the criteria of evaluation for this students, is the same that for the others and the percentage of dispenses of assistance will be of 80%. The objective proof is equal for all the students. The priority for obtaining qualifications "with honours", will be for the students that achieve this mark at the earliest opportunity.

Sources of information	
Basic	- LARSON (2006). CALCULO. McGrawHill
Complementary	- Alfonsa García (). Cálculo I. CLGSA - NEUHAUSER (2004). MATEMÁTICAS PARA CIENCIAS . Pearson - Bradley (). Cálculo. Prentice Hall - Salas / Hille / Etgen (). Cálculus. Reverté - Finney (). Cálculo. Addison-Wesley - Rogawski (2014). Cálculo, una variable. Editorial Reverté

Recommendations
Subjects that it is recommended to have taken before
Subjects that are recommended to be taken simultaneously
Subjects that continue the syllabus
Other comments
It is convenient to have studied Mathemathics in the final course of Secondary Education. For those students who have not, the nivelation course offered by the Faculty of Science is strongly recommended.

(*)The teaching guide is the document in which the URV publishes the information about all its courses. It is a public document and cannot be modified. Only in exceptional cases can it be revised by the competent agent or duly revised so that it is in line with current legislation.